UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

January 31, 1997

Mr. Stephen Chao
Naval Facilities Engineering Command
Engineering Field Activity, West
900 Commodore Way, Bldg. 210
San Bruno, CA. 94066-2402

Re: *Draft Final Station Wide Feasibility Study*, dated November 8, 1996

Dear Mr. Chao,

The U.S. Environmental Protection Agency (EPA) has received the subject document and provides the following comments. It has been reviewed by our Technical Support Section and our Office of Regional Counsel. There are many significant outstanding issues covered in these comments.

This document is a "Draft Final" version. We understand the Navy is aware of its deficiencies; its premature release was intended to meet the National Defense Authorization Act requirements. As specified in the Federal Facility Agreement (FFA) §9.9, the period between the draft final and the final submittal of a primary document is considered an informal dispute period. If the regulatory agencies have any remaining issues that must be addressed, we normally need to respond within 30 days to prevent the document from being finalized. Otherwise, the document automatically goes final. For the record, we want to document our verbal agreement to extend the comment period to Jan 31, 1997. This was due to both a RAB request for an extension and verbal agreement at the RPM meeting of December 11, 1996. Therefore, we now enter into informal dispute because of the outstanding issues adddressed in the attached comments. If you have any questions, please call me at 415-744-2385.

Sincerely,

Michael D. Gill

Michael D. Gill
Remedial Project Manager
Federal Facilities Cleanup Office

cc: J. Chou (DTSC), K. Eichstaedt (URS), T. Mower (PRC) (email), S. Olliges (NASA), M. Rochette (RWQCB), P. Strauss (MHB)

MR

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COMMENTS
Draft Final Station Wide Feasibility Study, dated November 8, 1996

GENERAL COMMENTS

1. The document is without question, a draft document. The ecological risk assessment results do not seem to have been incorporated into this effort by any interpretation of the overall risk. The Navy eliminated contaminants of concern (metals) through questionable logic, incorrectly interprets the hazard quotient results, incorrectly applies the hazard quotient results, does not provide adequate remedial options, and overestimates the costs of confirmation sampling for feasibility options and monitoring. There are none of the suggestions for cleanup levels included in the document that we discussed at the final RI meeting of September 20, 1996 (i.e., develop cleanup goals based on ambient, NOAEL, or risk-based levels, zero-risk based levels or monitoring only). Perhaps, another meeting is necessary to design the Feasibility Study based on the ERA and other information gained throughout the CERCLA activities at Moffett Field.

2. Risk standards. For several contaminants, significant levels of concentrations were observed as measured by effects assessment, i.e., bioassays or modeling to estimate the HQ and HIs. The effects assessments were significant at several locations, for several endpoints and for several receptors. There was significant risk observed in the Eastern Diked Marsh, the storm water retention pond inlet, and along the Northern Channel due to PCBs, pesticides and metals. Even if these data do not clearly present any definitive exposure-response relationship, they do establish a significant level of risk.

3. Risk Assessment vs. Risk Management. The Navy needs to present alternatives that consider the risk points of departure as recognized by Region 9 EPA so that the BCT can make an informed risk management decision when it comes to alternative selection. To reiterate, alternatives should also be developed to mitigate human health risks in the range of 10^{-4} to 10^{-6} and ecological risks when $HQ > 1$. Other cleanp level scenarios should be explored and cost estimates provided so that a final alternative selection can be justified based on the 9 criteria. A wider range of attainment areas, which translates to the inclusion of more conservative HQ's, should be investigated as cleanup goals in the FS. The HQ's considered may not provide a sufficient level of protectiveness to the receptors. This lack of protectiveness should be balanced in an analysis with more protective cleanup goals.

4. Long term ecological monitoring should include contingency actions. Otherwise, the process is incomplete. If certain ecological effects are observed during this monitoring, corrective action may be required.

5. Disposal options for treated sediments should include consolidation into Site 1, which may be designated as a CAMU.

6. The Navy should consider wetlands mitigation as part of the alternatives. See the EPA document entitled "An Approach to Improving Decision Making in Wetland Restoration and Creation" (EPA/600/R-92/150, August 1992) for more information and the Army Corps of Engineers "Draft Mitigation Proposal Guidelines Revision" handout from the September 20, 1996 meeting.

7. The FS does not provide a clear overview of the general characteristics of the sediment areas that will be potentially remediated. This information is critical to properly evaluate the need for remedial action and to evaluate the suitability of remedial alternatives.

8. There is considerable confusion in the use of the terms "sediment" and "soil" throughout the document. As stated in the executive summary and introduction, the scope of the FS includes contaminated sediments (associated with the Stormwater Retention Ponds, Diked Marshes, and Northern Channel) and Golf Course Landfill #2. A standard sediment definition, along with a better description of the target areas would help alleviate this confusion.

9. One important issue to consider when assessing remedial actions in the sediment target areas is the ecological impacts of the remedial action itself. The report simply states that the excavation and containment remedial actions will cause immediate ecological impacts; however, in order to fully evaluate the acceptability of the remedial alternative, it is important to understand the nature and extent (both spatial and temporal) of the impact of the remedial action on the plants and animals that inhabit the target areas. For example, if the remedial action would obliterate a local population of endangered species, the suitability of the remedial action could be deemed as very low. A thorough evaluation of the potential ecological impacts of the remedial alternatives must be presented. The evaluation should describe what resources will be impacted, how they will be impacted, the duration of the impact, steps taken to minimize remedial action impacts, and possibly the steps taken to enhance the natural recovery of the habitat.

10. Another primary remediation technology to consider is removal by excavation or dredging. The post-excavation remediation methods that were suggested as alternatives include treatment of excavated sediment by low temperature desorption and off-site disposal. Other post-excavation methods should also be considered. For example, upland on-site disposal of contaminated sediments in the Site 1 landfill (if designated as a CAMU) could be a cost effective remedial alternative. The Navy or NASA might have plans to reclaim some of the diked marsh area for terrestrial uses that would require fill material. A near-shore disposal of contaminated sediments within an engineered fill could meet both project objectives. Deep water disposal of contaminated sediments in San Francisco Bay could be another acceptable alternative, depending upon Corps of Engineers permitting restrictions. One additional point concerning excavation is that the

FS assumes the depth of excavation is limited to the top 1 foot of contaminated soils or sediments, and that the excavated area is then backfilled with clean soil or sediment. It is unclear whether a 1-foot-thick layer of clean sediment or soil over contaminated sediment or soil would be protective in the long term. It appears that additional refinement of the excavation or dredging remedial alternative is needed.

SPECIFIC COMMENTS

11. Executive Summary, page ES-2, last para. The landfill options should include excavation and consolidation, as is being considered at OU1.

12. Section 1.2, pages 3-12, Background. This section does not discuss surface water drainage patterns, stormwater run-off, or wetlands. It does not define the areas contributing to stormwater run-off (e.g., industrial, paved lots, vegetated areas, unvegetated dirt) and thus does not provide any information regarding potential sediment sources. It does not provide an adequate background for the sediment treatment alternatives presented in this document. This section needs to be revised accordingly with sufficient detail for the evaluation of the treatment alternatives.

13. Sect 1.2.2, page 5. Although Section 1.2.2 describes the current land use, it is not clear if there is potential in the future for a different land use or possible development. The current mitigation methods being proposed need to account for any future use changes. If there are no land use changes anticipated, then the text should state this.

14. Section 1.2.2, page 6. para 2. While NASA has indicated a desire to maintain a strong presence at MFA, the reader should also be aware that the NASA has also expressed uncertainties about their ability to retain enough tenants to cover the operating costs for MFA. This could have a direct impact on their ability to remain landlord in the future and in turn, allow for land use changes. This should be clarified in the text.

15. Section 1.2.3.1, page 8. Please update the OU1 schedule.

16. Section 1.2.3.2, page 8. "...no risks to human health or the environment were identified...". This is incorrect. A brief mention of the beryllium issue at OU2-East should be included here. Risks exist, but a risk management decision was made for no action because it was determined that beryllium was naturally occurring.

17. Section 1.2.3.5, page 9. We believe there are still outstanding Site 12 groundwater issues. Please clarify.

18. Section 1.2.3.6. This section should be expanded so the reader understands the characteristics of the sediment remediation target areas (i.e., Eastern and Western Diked Marshes, Stormwater Retention Ponds, and the Northern Channel). Descriptions of each area should include the following information:

- area permanently covered with water;
- whether the water is fresh or marine;
- water depth;
- tidal effects;
- historical and current discharge locations into the areas;
- past and current use of the target areas;
- land use by human and ecological receptors;
- habitat quality (does it provide critical habitat for any wildlife species?);
- locations of the areas; and
- routine maintenance activities (e.g., perhaps dredging to maintain flow is a normal maintenance activity in the target areas, and potential remedial actions involving dredging could be scheduled to coincide with maintenance activities).

19. Section 1.2.3.7, page 12, Potential Runway Wetland. Please update the status of the well abandonment at this site.

20. Section 1.3.1, page 13. It should be described here that both an exposure area approach and a point risk approach were used for the Station-Wide human health risk assessment.

21. Section 1.3.1, page 15, para 1. Clarify that Plate 2 summarizes carcinogenic risks for soils only. We are unsure how both residential and occupational could both be represented on this single plot. Please clarify. Also clarify in this paragraph that the west side soil risks were not included in the SWRI, but are covered by the MEW ROD.

22. Section 1.3.1.1, page 15, Residential Scenario. As stated in previous risk assessments, EPA Region 9 retains the right to consider the areas exhibiting human health risks within the risk range of 10^{-4} and 10^{-6} to be candidates for remediation. A risk of 10^{-6} is considered the point of departure, not 10^{-4}. Please consider all risks in soil greater than 10^{-6} when developing remedial alternatives.

23. Section 1.3.1.1, page 15, last para. The last sentence mentions Plate 1 as depicting locations of the exposure areas; it seems this should be Plate 2.

24. Section 1.3.2.1, page 17, Phase II SWEA Overview. The stated purpose of the SWEA is, "...to establish a quantitative and qualitative estimate of the risk to ecological receptors from exposure to COPECs at MFA." EPA has suggested that the quantitative effort be emphasized over the qualitative, which is best accomplished by strengthening the results of the bioassays (i.e., re-examine the interpretation of results), the tissue analyses, and direct sampling of the water, soil, sediment, and air at the site. The efforts that provide questionable data include exposure dose modeling and the qualitative benthic surveys. Although these questionable techniques have provided information for the screening phase of the ERA, the latter phases of the ERA process normally require direct measurements rather than unvalidated modeling. But because we now agree on what ecological areas are the most likely to be remediated (these are always site-specific determinations), it is time to move forward. In any case, the Navy needs to consider the use of empirical data (bioassays) when developing confirmatory sampling and long term ecological monitoring plans.

25. Section 1.3.2.1, page 17, Phase II SWEA Overview. The overview of the Phase II SWEA presented in Section 1.3.2.1 is difficult to understand and does not provide sufficient detail. Section 1.3.2.1 should be expanded so the reader can understand how the ecological assessment was performed and the results of the assessment. Please explain how the four HQs for each COPC-receptor were calculated and explain why this was done. What were the assessment endpoints? Throughout the report, reference is made to scenarios in which HQ_1 or HQ_4 is greater than 100; the necessary information from the SWEA is neither presented nor referenced.

26. Section 1.3.2.1, page 18, para 2, Measures of Risk. The primary focus of the Navy for the Moffett ERA was the modeled hazard quotient (HQ). The general method for calculating Moffett Field HQs is based on several authors that are in general agreement for this approach. The interpretation of these HQs as presented and the hazard indices (the sum of several HQs) is not widely accepted and is based on a study without any technical basis other than convenience derived by the study authors (Menzie et al, 1992). The generally recognized interpretation of the HQ, which should be limited to the screening phase, is that ratios above 1.0 indicate a potentially significant effect and other values above 1.0 are viewed in the same range. Very seldom are input data sufficient, i.e., with low uncertainty, to permit any relationship of higher risk with values greatly above unity, as is the case for MFA.

27. Section 1.4.2.1, 1.4.2.1.1, page 35. "Groundwater is not affected...". It would be more accurate to mention that groundwater close to the wetlands areas is covered by the OU5, MEW (west side aquifer) and the OU1 remedial actions.

28. Section 1.4.2.1.1, page 35. Why are the NOAA sediment criteria TBCs rather than

ARARs? Are they set forth in guidance rather than regulations? Please discuss the NOAA sediment criteria in more detail. Also, please provide a copy of or a citation to the criteria so EPA can review them.

29. Section 1.4.2.1.3, page 37, California Hazardous Waste Regulations. This comment addresses management of RCRA or non-RCRA hazardous wastes in accordance with State of California hazardous waste storage, treatment and disposal regulations. This section is not entirely accurate. Where the waste is a RCRA waste and the state RCRA standard is not more stringent, the federal RCRA regulation is cited as the ARAR. At some sites, we have cited both the federal and the state ARAR saying that the federal ARAR cited is implemented via the State ARAR. Where the waste is a non-RCRA hazardous waste (as is the case with PCBs which are hazardous under California RCRA regulations but not under the Federal RCRA regulations), then the State regulations alone are cited as the ARAR. Similarly, if the State has a more stringent standard for a RCRA hazardous waste, then the State regulations alone are cited as the ARAR.

30. Section 2.1.1, page 41, para 2, Remedial Action Objectives (RAO). "In general, the RAO for sediments is to adequately protect human health and the environment by limiting exposure to COCs." Because the Feasibility Study should incorporate the results of the risk assessment, it seems that one of the objectives of the RAO would be to reduce the level of risk to the site receptors below those levels identified in this risk assessment as significant risks. This implies that known levels of risk established during this ERA, can be identified as acceptable such that the site receptors will not be significantly impacted, thereby limiting the risk to the assessment endpoints. The results of this ERA indicate that the primary exposure pathway is "direct contact" (includes ingestion) with contaminated sediments. Again, little information/interpretation is provided to show the quantitative relationship between the exposure, i.e., contaminant concentration, and the response of the receptors and endpoints.

31. Section 2.1.1.1, page 42, para 1. "There are no COCs for the landfills." This appears to be incorrect. If one reviews Appendix E of the Station-Wide RI, Site 22 shows risk greater than 10^{-6} due to PCBs and benzo(a)pyrene for the recreational and occupational scenarios (dermal contact and ingestion of soils) and risk greater than 10^{-6} due to PCBs for the recreational scenario (dermal contact). This seems to qualify PCBs (Aroclor-1242, 1254, 1260) and benzo(a)pyrene as COCs.

32. Section 2.1.1.1, page 42, para 2, Chemicals of Concern. Section 2.1.1.1 states that metals have been eliminated as COCs for the purposes of identifying remedial areas for several reasons; however, the human health and ecological PRGs presented in Section 2.1.1.2 do discuss metals, and it is uncertain whether metals were included in the target area risk estimates or not. This point needs clarification. If the metals were indeed excluded from the target area risk estimates, it is suggested that the discussion of PRGs be limited to the organic chemicals.

In this section it is stated that: "The rationale for screening out metals includes high ambient conditions with no identifiable sources." This statement needs clarification; it is probably intended to refer to high naturally occurring background concentrations of the metal COCs. This statement should be reworded, and accompanied with detailed discussion and references to support the screening out of metals from further consideration in the FS. This is particularly significant, since in Appendix B (Evaluation of Metals Concentrations...) the conclusions state that: "Concentrations of various metals in shallow wetland sediments appear elevated with respect to local background levels." Further discussion should be included to rule out the contaminant migration from MFA.

In the same sentence on page 42, reference is made to "high concentrations of metals in sediments regionally from urban water run-off." It is not clear what sediments are being referred to in this statement. Please reword and provide accompanying text. The discussion provided in the third paragraph of page 42 discusses metal concentrations with respect to soil and sediment horizons, but does not discuss spatial distribution with respect to hydraulic gradient. This is an important omission that needs to be rectified.

33. Section 2.1.1.2.1, page 43, para 1. Same as general comment. Areas with risks in excess of 10^{-6} should be evaluated for remedial action.

34. Section 2.1.1.2.1, page 43, Human Health Risk-Based PRGs. The derivation of human health PRGs is presented in Section 2.1.1.2.1. This section is very difficult to understand as presented. It appears that most of the PRGs were calculated assuming a residential exposure scenario. It is not clear why residential soil PRGs are being used as sediment benchmarks. Residential units are generally not built on sediment; thus, it is assumed that imported fill would be used prior to construction. In fact, wetlands regulations would probably exclude any residential construction on these areas (see OU6 RI). Since the exposure factors that were used to assess risks from exposure to sediments are not presented, it is not possible to evaluate whether these are appropriate to use as PRGs. If the sediment PRGs were calculated assuming typical residential exposures, it would not be appropriate to use them as clean up goals, because they would be overly conservative and would not be representative of site conditions.

A more detailed explanation of the human health risk assessment and calculation of PRGs is required in this section.

35. Section 2.1.1.2.1, page 45, Ecological Risk-Based PRGs. (This section should be renumbered as 2.1.1.2.2) The terms HQ_1 and HQ_4 are not defined. The statement: "A moderate level of protection for this habitat would be for HIs of less than 100, since below this level it is not clear whether population changes occur" must be substantiated. A summary discussion of aquatic and terrestrial receptors must be presented, with their associated HIs.

36. Section 2.1.1.2.1, page 46, Ecological risk-based PRGs. There are no EPA sanctioned

"ecological PRGs", nor do we know of any other Federal or State agency that promotes or recognizes such standards. Again, the HQs and HIs have limited application only to the screening process, therefore, they are not appropriate for determining overall risk, and especially not appropriate for setting cleanup levels as presented. The interpretation provided as cited in Menzie et al (1992) is not recognized by EPA and is therefore not appropriate. The quantitative results of the ERA that have been validated should be used to set cleanup levels. For this assessment, the bioassays and direct measurements of the contaminant levels should be used to set cleanup levels. Long term ecological monitoring will probably provide the most accurate measure of effect. The data provided in the papers by Long et al (1995), i.e., the ER-Ls and ER-Ms, are not appropriate for setting cleanup levels. The site specific bioassays are more appropriate and logical for this process, rather than data gathered from other parts of the country that may or may not relate to the receptors and the endpoints identified for this site. Finally, HQ values should not be used to set cleanup levels.

37. Section 2.1.2, page 47, Landfills. An excavation and consolidation alternative should be included for the landfills in this FS. It could be used in conjunction with the Site 1 CAMU being considered.

38. Section 2.2, page 48. The general response actions for sediments should include mitigation of impacted habitat as an alternative.

39. Section 2.2.1, page 48. What constitutes an institutional controls is subject to discussion, but the current thinking is that the term refers only to restrictions (which may or may not be legally enforceable such as deed restrictions, permitting, etc.) and not to physical restrictions which are considered more akin to engineering controls. We suggest deleting "physical" from the first sentence in the Institutional Controls paragraph.

40. Section 2.2.1, page 49, General Response Actions - Containment. The containment part of this section needs to be revised. Capping or stabilizing sediment are the only alternatives presented for consideration. This section should be rewritten to include sediment control barriers, vegetation of potential source areas to reduce erosion, and other measures to reduce the sediment transport to the target ecosystems. A major part of the containment strategy should be to reduce the sediment load entering the drainage system, insofar as this is possible.

41. Section 2.2.1, page 49, General Response Actions - Active Remediation. The statement that active restoration is appropriate "because conditions at MFA are favorable for some type of remediation" is weak and of no use. Obviously, "some type of remediation" could be used at any site. Please rewrite this paragraph.

42. Section 3.1.4, pp 54-55, Removal. Sufficient information, i.e., calculations, are not presented to show the difference in excavation of one foot of soil compared to two feet of soil and sediments. The statement, "...significant costs associated with excavating

large quantities..." is incomplete.

43. Section 3.1.7, page 58, Disposal. The Navy should include in this evaluation the potential for disposal at Mare Island or other Navy sites in the S.F. Bay area, including the Site 1 landfill at MFA.

44. Section 3.2, page 60, Evaluation of Sediment Process Options. As a result of the ERA, the Navy identified several sediment process options. These were evaluated on the basis of three general factors: 1) effectiveness; 2) implementability; and 3) relative costs. Each of these factors are further evaluated through specific factors:

> a. effectiveness - ability to treat the estimated volume or area of contaminated media; - the level of protection for human and ecological resources; - the reliability of the alternative to reduce the toxicity, mobility, and volume of contamination at the site and provide long-term protection;
>
> b. implementability - this factor incorporates both technical and administrative feasibility. Technical implementation is evaluated by the ease of construction, operation, and maintenance of an alternative. Administrative feasibility refers to the ability to obtain agency approval and the availability of materials and qualified operating staff;
>
> c. Any alternative with costs that exceeds, by one order of magnitude, another alternative with similar protectiveness will be eliminated.

These evaluators for the process options seem to be straightforward; however, there are duplicating and overlapping factors that may be biased by other options. The relative cost is the most quantitative and measurable; however, it can be influenced by the choices of comparison, especially for the various choices and the order of comparison. Some of the suggested estimates for costs have little basis on what is needed or reflects reality of performance.

> 1) No action - This option offers no protection to the ecological receptors, therefore is unacceptable as a remedy.
> 2) Institutional controls - This "remedy" may be protective of human health, but offers no protection to biological receptors, and, again, is unacceptable.
> 3) Containment - This option is not clearly stated, i.e., "...reducing the mobility of compounds and eliminating potential routes of exposure by isolation" in this document and therefore is inadequately presented.
> 4) Active restoration (treatment) - This option is not fully developed in this document and therefore is inadequately presented.

45. Section 3.2.3, pp 62-64, Collection. Sediments designated for collection and disposal should be considered for use as containment material at a landfill, possibly Site 1. The

sediment may be able to provide the proper structural and permeability characteristics to allow its use as a base layer for supporting the cap. If this action is not feasible, substantive reasons should be provided as to why it is not.

46. Section 3.2.3, page 64, para 4. Explain how the estimated 43,000 cubic yards of contaminated sediment was calculated. Also, what are the "toxicity levels" for a California Class II landfill? Please provide them.

47. Section 3.2.4, page 65, Containment. EPA does not support any activity that involves a concrete cap for the Eastern Diked Marsh or the storm water retention pond inlet. See comment on Section 5.1.4.

48. Section 3.3.2, pp 72-73, Containment. A multilayer cap should include consideration of a single-barrier clay liner such as Claymax™ or equivalent, given the limited area requiring coverage (7 acres), and the cost competitiveness of liners relative to soil barrier layers. At the time of EPA's 1991 guidance, *Conducting RI/FS Studies for CERCLA Municipal Landfill Sites*, the cost for such single-barrier clay liners was generally prohibitive, but it may not be so now.

Another alternative that should be considered is the use of the contaminated sediments as part of the barrier layer. The sediments could be used as the bedding or subgrade layer. If the permeability is sufficiently low (in the $1x10^{-7}$ cm/sec range), then the excavated sediments could be used as part of the barrier layer.

49. Section 3.4.3, page 75, para 1. Please provide a reference for the NMOC landfill gas emissions calculations.

50. Section 4.1, page 76. EPA disagrees with the statement and the implications for the Navy statement, "The SWEA revealed (i.e., produced) many uncertainties...". The issues listed are not issues at all; they involve requirements of the CERCLA process. The remediation process is required to correct the site conditions that were identified as significantly impacting the biological resources at Moffett Field. The ERA is "questioned" by the Navy for adequacy to define baseline conditions and is considered inadequate at the same time by the regulatory agencies. The ERA is the responsibility of the Navy and must meet minimum standards of the agencies. Despite the doubts of the Navy for the adequacy of the baseline risk assessment, cleanup of the site will benefit the site receptors. The Navy is trying to construe the habitat as "...of moderate quality" (p 46) and at the same time suggesting that the "public" and "regulatory agencies" may not accept the excavation of contaminated sediments because this action will, "destroy active and thriving wetlands and ecological habitats..." (p 76). These are contradictory statements.

51. Section 4.1, page 76, Alternative 2. By selecting Alternative 2 as a remedy, it seems to state that given the lack of information, the Navy is choosing to monitor rather than

take action. At other sites, these kinds of situations have been considered treatability studies so that the federal facility could monitor the situation without foreclosing the possibility of future action.

52. Section 4.1, page 76, Alternative 2. If Alternative 2 is selected and institutional controls are to be implemented, consider whether some sort of legal restriction on use would be appropriate and what that restriction would be. This can be rather complicated at federal facilities and so would need to be discussed in more detail in a ROD, if selected.

53. Section 4.1, pages 76, 77. The alternatives proposed here are insufficient, as they only consider excavation of sediments where the least conservative HQ (HQ_1) is exceeded, and then only for $HQ_1 > 100$. A value of 1 is the accepted minimum HQ where a potential ecological risk could exist. For a fair comparison, other more protective HQ values should be considered for determining if excavation of sediments is necessary. In addition, capping remaining areas using onsite unimpacted wetland background levels as cleanup goals should be considered as another alternative. The remedial alternatives, as presented, do not provide an adequate, nor recommended level of protection for the biological resources or habitat at Moffett Field. The levels of risk represented by the Navy's estimate using the HQ_1 is under-protective, inadequate, unsupported, and unacceptable for any remedial options proposed at Moffett Field.

54. Section 4.1, pp 76,77. The alternatives presented in this section do not include containment. Please present the rationale for excluding this option.

The alternatives are not clear as presented, because the document does not define HQ_1 and HQ_4. It is therefore impossible to determine which areas are to be excavated and which are to be capped.

55. Section 4.1, pp 78-79. A systematic series of nomenclature errors render this section very confusing. For each section from 4.1.3 through 4.1.7, the first sentence references the wrong alternative. For example, in Section 4.1.3, Alternative 3, Hazard Quotient Greater than 100, the first sentence states that: "Under Alternative 2, contaminated sediments exceeding HQ_1 greater than 100.....would be removed...". Clearly, this should read "Alternative 3," since Alternative 2 is the use of institutional controls only. This is common to the other sections as well.

56. Section 4.2.2.1, page 80. Multilayer Cap ARARs will probably be the same as those selected for OU1. It is possible that some federal ARARs (e.g., sections of RCRA Subtitle D) may be applicable. See the OU1 ROD.

57. Section 5.1.2, page 89, Compliance with ARARs. This institutional controls alternative should not be called a "no action" alternative.

58. Section 5.1.4, page 92, Containment. One of the primary remedial technologies

suggested for use in remediating contaminated sediments is containment. On page 92, it is stated that the containment method will be "pouring cast-in-place concrete liners over contaminated site sediment." Considering the potentially vast extent of areas that would require containment (see Figure 14), this containment method is considered impractical. In addition, containment with concrete liners would permanently destroy the habitat, which is undesirable. Containment of contaminated sediments is generally achieved by capping with a thick layer of clean sediment approximately 3 feet thick. Another capping alternative would be a thin layer cap of clean sediment of approximately 6 inches that would effectively reduce ecological exposure in the short term, and would reduce chemical concentrations in the sediment in the long term by mixing of clean and contaminated sediments. Thin layer capping can also be done in stages to minimize ecological impacts. These alternative containment methods should be fully evaluated in this FS.

59. Section 5.2, page 96, Landfill. Although Alternative 1 identifies an existing soil cap, this is not adequately discussed in the text. Please describe the existing soil cap.

60. Section 5.2.2, pp 98-100, Multilayer Cap. The costs associated with the multilayer cap should be reviewed. The yearly O&M is excessive, calling for revegetation on a yearly basis. It is unlikely that LFG monitoring would need to be performed on a quarterly interval. The cost for site management needs to be better defined.

61. Section 6.0, page 101, Comparative Analysis. A table showing some sort of "ranking" (possibly a scale of 1 to 5) to describe how well each alternative meets the 9 criteria would be effective in summarizing the comparative analysis.

62. Section 6.1.1, page 102. Although the RI/FS concludes that Alternative 2 will meet threshold criteria to protect human health and the environment, this paragraph previously states that Alternative 2 may not protect the environment because of the lack of information regarding ecological risks. This really seems to say that there is insufficient information to say whether or not the alternative is protective of the environment. That is not the same as saying that it is protective. One possibility is to consider this a treatability study or consider it a contingent remedy based upon the results of the study. That would also require considering some baseline information regarding what information would be necessary to determine whether Alternative 2 is protective or whether the contingent remedy should be employed.

63. Section 6.1.2, page 103, para 1. "None of the alternatives guarantees a permanent solution..." If this is the case, then the ROD will have to be called an Interim or Contingency ROD. Using this type of language should be avoided, unless there will be consideration for additional remedial action in the future. As is typically stated in the Declaration of any ROD, "The remedy utilizes permanent solutions and alternative treatment technology, to the maximum extent practicable...".

64. Section 6.1.2, page 103, Balancing Criteria - Reduction of Toxicity, Mobility and Volume. The sentence: "The amount of toxicity and volume reduced for Alternatives 3 through 6 will be the same" is unclear and incorrect. Alternative 3 includes no capping, and therefore does not present the same reduction in mobility as Alternatives 4 through 6. Alternatives 4 through 6 all appear to call for the capping of different areas (although the document does not adequately define these areas). Alternative 7 is not mentioned. The sentence: "Alternatives 1 and 2 reduce the least amount of toxicity and volume" is grammatically incorrect. This whole section should be rewritten.

65. Section 6.1.2, page 103, Balancing Criteria - Short Term Effectiveness. The statement that: "None of the alternatives would have grave short term impacts" is incorrect. The excavation and capping proposed would have a very substantial impact on the ecosystems concerned. Please rewrite this section.

The phrase "...the most amount of potential impact" is grammatically incorrect; please rewrite. The sentence: "Alternatives 1 and 2 would have the greatest potential for short term effectiveness" is technically incorrect, and essentially meaningless, since these alternatives are "no action" and "institutional controls only," respectively. Please delete this sentence.

66. Table 4. The remediation goal for Exposure Area 4312 is inconsistent with the text in the last paragraph on page 43. Should it read "10-25 mg/kg"?

67. Table 9, MFA Summary of Alternate Costs. This table is inadequate. It should be amended to include the approximate volume of soil to be excavated (the same for each alternative) and the areas to be capped for each alternative. This information is presented in Appendix D of this document. The salient information should be extracted and presented in Table 9, and Table 9 should be referenced to Appendix D. Further text discussion, including the assumptions made in developing the cost estimates, must be presented for each alternative to support the cost ranges presented.

68. Figure 2. The "Scale In Feet" legend appears incorrect when compared to other figures.

69. Figures 11, 12, 13. Figures 11, 12, and 13 present areas of elevated ecological risk for several different scenarios, as explained on pages 78 and 79. Please clarify what the polygons represent. It is stated on page 21 that Figures 11, 12, and 13 report hazard scenarios for avian and mammalian receptors, while footnotes to the figures indicate that the hazards are for benthic invertebrates and terrestrial (?). If one assumes that the risks depicted in the figures are limited to the avian and mammalian receptors, how was the risk within a polygon determined? Text on page 21 leads to the conclusion that the receptor used to calculate risks in the figure is the great blue heron. The reader assumes that risks to the heron were calculated for oral exposure to sediment and fish, and that consumption of fish would be the primary route of exposure. An expanded explanation of how Figures 11, 12, and 13 were derived is required.

Sediment sample locations fail to show flow and surface drainage direction, rendering them impossible to interpret. Please mark all figures accordingly.

70. Figure 17. In the legend, is the symbol for "Fill" indicative of solid waste? If so, please change this title. Using the term fill may indicate uncontaminated material.

71. Appendix A, Tables. Use similar detail for the ARARs tables for landfills in Appendix A as is used for the OU1 ROD.

72. Appendix A, Tables A-3, A-4. Please add an "ARARs Determination" column on these tables, as is done for Tables A-1 and A-2.

73. Appendix B. The Summary and Conclusions section of this appendix states that: "Concentrations of various metals in shallow wetland sediments appear elevated with respect to local background levels." This is supported by Table B-3, which shows that most of the metals results for the marsh, stormwater retention ponds, and ditches and channels exceed the UCL95 (background) levels. No discussion is presented of metals concentrations in wetlands hydraulically upgradient of the MFA facility (if they exist). Either wetland or stream bed/creek bed upgradient sediment results for metals should be presented to support the assumption that the metals contamination is not from MFA. Further discussion must be included to rule out the contaminant migration from MFA.

74. Appendix C. Appendix C provides a proposal for the long-term ecological monitoring of MFA. Elements of the proposed monitoring for the initial 5-year period are: annual sediment chemistry analysis, annual sediment toxicity testing using a bivalve larvae test, annual tissue chemical analysis using a bivalve, and benthic community analysis performed immediately following remedial action, at 2 years and 5 years post-action. Although Appendix C provides a conceptual framework for the monitoring work, more details are needed before the design can be properly evaluated. Besides providing more details on the field design and methods, it is also necessary to state how results will be evaluated, and what actions could be taken based upon the results (contingency plan).

75. No Data Quality Objectives (DQOs) are presented; will this sampling be conducted under an existing QAPP? Ecological Monitoring Data Quality Objectives must be developed to fulfill this objective.

76. The sample grid size is not defined on page C-3. Please present a grid size and the rationale for selecting it.

77. The number of samples listed in the table on page C-4 does not seem adequate. Please provide the rationale for these numbers.

78. No information is presented as to the locations of the sample points with respect to hydraulic gradient. Will background samples be collected? No QA/QC samples are

presented. Please address all of these issues.

79. Appendix D. Cost estimates for the remedial alternatives are presented in Appendix D. Costs for Alternatives 3 though 7 are similar despite the fact the areas considered for containment (i.e., cover with a concrete slab) vary considerably (i.e., Alternative 3 versus Alternative 6). Cost estimates presented in Appendix D do not appear to include costs for the containment portion of the remedial actions. Appendix D must be modified to reflect costs for the containment technology.